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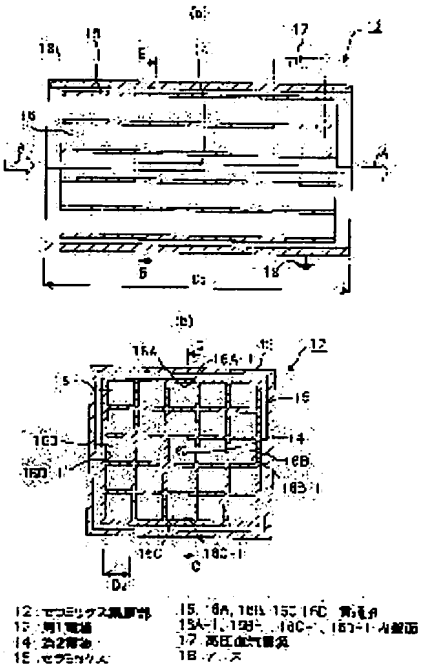
## (54) ELECTRIC DUST COLLECTOR

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an electric dust collector capable of realizing a space- saving and a low cost by enhancing a capturing efficiency.

SOLUTION: The electric dust collector is provided with a ceramics dust collection part 12 constituted so as to collect a dust in a gas flowing in through- holes at the inner wall surfaces of the through-holes by disposing the ceramics 15 having a large number of through-holes 16 between a first electrode 13 and a second electrode 14 and applying a high voltage to these electrodes to apply an electric field to a whole ceramics. The flat plate-like first and second electrodes are arranged as opposed to each other and a cross section shape of the through-hole of the ceramics is made to a rectangular shape in which a length is longer in a direction perpendicular to the electric field direction formed between the electrodes or may be made to a slit-like shape in which the length is longer in the direction perpendicular to the electric field direction and which has a length over a whole length of a ceramics width in the same perpendicular direction. This ceramics dust collection part may be disposed at a latter stage of a conventional dust collection part.



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CLAIMS

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[Claim(s)]
[Claim 1] The electrostatic precipitator characterized by to have the dielectric dust-collection section which constitutes and becomes so that uptake of the soot dust in the gas which flows the breakthrough of a porous dielectric by arranging the porous dielectric which has the breakthrough of a large number penetrated along with the gas flow direction between the 1st electrode and the 2nd electrode, impressing high tension to this 1st electrode and 2nd electrode, and applying electric field to the porous whole dielectric may be carried out by the internal surface of this breakthrough.
[Claim 2] It is the electrostatic precipitator characterized by being the cylindrical electrode which the 1st electrode of the dielectric dust collection section is a tubed electrode surrounding the perimeter of a porous dielectric in the electrostatic precipitator indicated to claim 1, and has arranged the 2nd electrode along with a gas flow direction in the inside center section of the 1st electrode.
[Claim 3] It is the electrostatic precipitator which the 1st electrode and the 2nd electrode of the dielectric dust collection section are a plate-like electrode, and carries out opposite arrangement at the both sides of a porous dielectric as meets a gas flow direction, and is characterized by the breakthrough of a porous dielectric considering as the shape of a rectangle long in the direction of electric field where a cross-section configuration is formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly in the electrostatic precipitator indicated to claim 1.
[Claim 4] In the electrostatic precipitator indicated to claim 1, the 1st electrode and the 2nd electrode of the dielectric dust collection section are a plate-like electrode. As a gas flow direction is met, opposite arrangement is carried out at the both sides of a porous dielectric. The breakthrough of a porous dielectric is an electrostatic precipitator characterized by considering as the shape of a slit of the die length covering the abbreviation overall length of the porous dielectric width of face of this rectangular direction for a long time in the direction of electric field where a cross-section configuration is formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly.
[Claim 5] Impress high tension between a collecting electrode and a discharge electrode, and a charge is given to the soot dust in the gas which flows between this collecting electrode and discharge electrode. Arrange the dust collection section constituted so that uptake of this charged particle might be carried out to a collecting electrode in the preceding paragraph, and the dielectric dust collection section indicated in the latter part of this dust collection section said claims 1, 2, and 3 or 4 is arranged. The electrostatic precipitator characterized by constituting so that uptake of the charged particle which came out of the dust collection section of the preceding paragraph may be carried out by the internal surface of the breakthrough of the porous dielectric in the latter dielectric dust collection section.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is applied when performing clearance of the fly ash contained in the exhaust gas of a coal **** boiler etc., concerning an electrostatic precipitator, and it is useful.
[0002]
[Description of the Prior Art] The conventional electrostatic precipitator (EP:electrostatic precipitator) is the thing of a configuration of giving a charge to the soot dust in the gas which flows between a discharge electrode and collecting electrodes, and carrying out uptake of this charged particle to a collecting electrode by impressing high tension between a discharge electrode and a collecting electrode, generating corona discharge, and ionizing gas.
[0003] Drawing in which drawing 5 shows the example of a configuration of this conventional electrostatic precipitator, and drawing 6 are the sectional views which saw the dust collection section with which said electrostatic precipitator was equipped from the upper part. The conventional electrostatic precipitator 1 shown in drawing 5 is a dry-type thing, and in order to obtain the desired high dust collection engine performance, it equips the serial with two or more steps (the example of a graphic display three steps) of dust collection sections 2 along with the gas flow direction (the direction of arrow-head A).
[0004] As shown in drawing 6 , the dust collection section 2 comes to have the collecting electrode 3 which is a plate-like electrode, and the discharge electrode 4 which is a cylindrical electrode. The discharge electrode 4 is prolonged in the vertical direction (direction which intersects perpendicularly with the space of drawing 6 ), and the a large number book is arranged at the predetermined spacing along with the gas flow direction at the single tier. Along with the gas flow direction, as a collecting electrode 3 sandwiches the train of a discharge electrode 4 from both sides, opposite arrangement is carried out. Spacing D1 of a collecting electrode 3 and a discharge electrode 4 For example, it is about 100mm. High tension is impressed to a collecting electrode 3 and a discharge electrode 4 by high voltage DC power supply 5. An electrical potential difference is impressed so that the collecting electrode 3 to which the ground 6 was given at this time may turn into a positive electrode and a discharge electrode 4 may turn into a negative electrode.

[0005] Therefore, according to the electrostatic precipitator 1 of the above-mentioned configuration, if high tension is impressed to the collecting electrode 3 and discharge electrode 4 of the dust collection section 2 by high voltage DC power supply 5, dielectric breakdown of the gas of the discharge electrode circumference will be carried out locally, corona discharge will arise, and a gas molecule will ionize by this corona discharge. Consequently, with the anion at this time, a charge is given to the soot dust (fly ash contained in the exhaust gas of a coal **** boiler) in the gas which flows the inside of electric field (between a collecting electrode 3 and discharge electrodes 4), this charged particle moves to a collecting electrode 3 according to Coulomb force, and uptake is carried out.
[0006]
[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional electrostatic precipitator, since the travel of the charged particle from a discharge electrode 4 to [ from about 100mm and a ******** ] a collecting electrode 3 has a long distance of a collecting electrode 3 and a discharge electrode 4, it is necessary to lengthen the gas flow direction die length of the dust collection section 2. Moreover, since uptake of the charged particle is carried out by the collecting electrode 2 and dust collection area is small, for obtaining the desired high uptake engine performance, it is necessary to make [ many ] the number of stages of the dust collection section 2. For this reason, the whole equipment is enlarged, and a large installation tooth space is needed, and cost also starts. Moreover, the needs of high-performance-izing

are also expected as a cure to toughening of regulations of future outlet dust concentration.
[0007] Therefore, let it be a technical problem to offer the electrostatic precipitator which this invention can raise collection efficiency in view of the above-mentioned trouble, and can attain space-saving-izing and low cost-ization.
[0008]
[Means for Solving the Problem] The electrostatic precipitator of the 1st invention which solves the above-mentioned technical problem By arranging the porous dielectric which has the breakthrough of a large number penetrated along with the gas flow direction between the 1st electrode and the 2nd electrode, impressing high tension to this 1st electrode and 2nd electrode, and applying electric field to the porous whole dielectric It is characterized by having the dielectric dust collection section which constitutes and becomes so that uptake of the soot dust in the gas which flows the breakthrough of a porous dielectric (charged particle) may be carried out by the internal surface of this breakthrough.
[0009] Moreover, it is characterized by for the electrostatic precipitator of the 2nd invention being a tubed electrode with which the 1st electrode surrounds the perimeter of a porous dielectric in the electrostatic precipitator of the 1st invention, and the 2nd electrode being a cylindrical electrode arranged along with a gas flow direction in the inside center section of the 1st electrode.
[0010] Moreover, it is characterized by for the 1st electrode and the 2nd electrode having been plate-like electrodes, having carried out opposite arrangement of them in the electrostatic precipitator of the 1st invention, at the both sides of a porous dielectric, as the electrostatic precipitator of the 3rd invention met the gas flow direction, and the breakthrough of a porous dielectric considering as the shape of a rectangle with a cross-section configuration long in the direction of electric field formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly.
[0011] Moreover, the electrostatic precipitator of the 4th invention is set to the electrostatic precipitator of the 1st invention. The 1st electrode and the 2nd electrode are plate-like electrodes, and as they meet a gas flow direction, they carry out opposite arrangement at the both sides of a porous dielectric. It is characterized by the breakthrough of a porous dielectric considering as the shape of a slit of the die length covering the abbreviation overall length of the porous dielectric width of face of this rectangular direction for a long time in the direction of electric field where a cross-section configuration is formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly.
[0012] Moreover, the electrostatic precipitator of the 5th invention impresses high tension between a collecting electrode and a discharge electrode. Give a charge to the soot dust in the gas which flows between this collecting electrode and discharge electrode, and the dust collection section constituted so that uptake of this charged particle might be carried out to a collecting electrode is arranged in the preceding paragraph. It is characterized by constituting so that uptake of the charged particle which has arranged the dielectric dust collection section indicated to said claims 1, 2, and 3 or 4 in the latter part of this dust collection section, and came out of the dust collection section of the preceding paragraph to it may be carried out by the internal surface of the breakthrough of the porous dielectric in the latter dielectric dust collection section.
[0013]
[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained to a detail based on a drawing. In addition, the same sign was given to the same part as usual ( drawing 5 , drawing 6 ).

[0014] [Gestalt 1 of operation] drawing 1 is the block diagram of the electrostatic precipitator concerning the gestalt 1 of operation of this invention. Drawing of longitudinal section (C-C line view sectional view of drawing 2 (b)) of the ceramic dust collection section which equipped said electrostatic precipitator with drawing 2 (a), and drawing 2 (b) are the cross-sectional views (B-B line view sectional view of drawing 2 (a)) of said ceramic dust collection section.
[0015] The electrostatic precipitator 11 of the gestalt 1 of this operation shown in <configuration> drawing 1 is a dry-type thing, and has two-step composition which has arranged the dust collection section 2 in the preceding paragraph (upstream of the gas flow direction shown by the arrow head A), and has arranged the ceramic dust collection section 12 in the latter part (downstream of this gas flow direction).
[0016] The dust collection section 2 is the same as that of the dust collection section of the former (refer to drawing 5 and drawing 6 ). That is, the dust collection section 2 comes to have the collecting electrode 3 which is a plate-like electrode as shown in drawing 6 , and the discharge electrode 4 which is a cylindrical electrode. The discharge electrode 4 is prolonged in the vertical direction (direction which intersects perpendicularly with the space of drawing 6 ), and the a large number book is arranged at the predetermined spacing along with the gas flow direction at the single tier. Along with the gas flow direction, as a collecting

electrode 3 sandwiches the train of a discharge electrode 4 from both sides, opposite arrangement is carried out. Distance D1 of a collecting electrode 3 and a discharge electrode 4 For example, it is about 100mm. High tension is impressed to a collecting electrode 3 and a discharge electrode 4 by high voltage DC power supply 5. An electrical potential difference is impressed so that the collecting electrode 3 to which the ground 6 was given at this time may turn into a positive electrode and a discharge electrode 4 may turn into a negative electrode.

[0017] Therefore, if high tension is impressed to the collecting electrode 3 and discharge electrode 4 of the dust collection section 2 by high voltage DC power supply 5, dielectric breakdown of the gas of the discharge electrode circumference will be carried out locally, corona discharge will arise, and a gas molecule will ionize by this corona discharge. Consequently, with the anion at this time, a charge is given to the soot dust (fly ash in the exhaust gas of a coal **** boiler etc.) in the gas which flows the inside of electric field (between a collecting electrode 3 and discharge electrodes 4), this charged particle moves to a collecting electrode 3 according to Coulomb force, and uptake is carried out.

[0018] And uptake is carried out in the dust collection section 2 of this preceding paragraph, and after inside ********** comes out of the dust collection section 2, it is introduced to the latter ceramic dust collection section 12.

[0019] As shown in drawing 2 , in the ceramic dust collection section 12, the ceramics 15 which is a dielectric is arranged between the 1st electrode 13 and the 2nd electrode 14. The ceramics 15 is a porous dielectric which has the breakthrough 16 of a large number penetrated along with the gas flow direction, and these breakthroughs 16 serve as a gas passageway. A cross-section configuration is all a square-like, the breakthrough 16 has aligned in the direction of four directions in drawing 2 (b), and the ceramic 15 whole has become honeycomb-like. Die length D2 of one side of the cross section of a breakthrough 16 For example, it is about 10mm.

[0020] A cross-section configuration is a tubed rectangle-like electrode, and the 1st electrode 13 is arranged so that the perimeter of the ceramics 15 may be surrounded. The 2nd electrode 14 is a cylindrical electrode and is arranged along with the gas flow direction in the inside center section of the 1st electrode 13. High tension is impressed to the 1st electrode 13 and the 2nd electrode 14 by high voltage DC power supply 17. An electrical potential difference is impressed so that the 1st electrode 13 with which the ground 18 was given at this time may turn into a positive electrode and the 2nd electrode 14 may turn into a negative electrode.

[0021] According to the electrostatic precipitator of the gestalt 1 of an operation and <effectiveness> book implementation, if high tension is impressed to the 1st electrode 13 and the 2nd electrode 14 by high voltage DC power supply 17, the electric field produced between the 1st electrode 13 and the 2nd electrode 14 will be applied to the ceramic 15 whole. Therefore, uptake of the charged particle which was charged in the dust collection section 2 of the preceding paragraph, and was introduced to the latter ceramic dust collection section 12 is carried out to the internal surface of the breakthrough 16 of the ceramics 15 by operation of the electric field applied to the ceramic 15 whole.

[0022] and since the ceramics 15 has many breakthroughs 16, compared with the conventional dust collection section 2 (refer to drawing 5 and drawing 6 ), it is markedly alike, dust collection area becomes large, and the ceramic dust collection section 12 of dust collection efficiency improves substantially. For this reason, number-of-stages reduction of the dust collection section can be aimed at. for example, although it needed to consider as the three-step configuration as shown in drawing 5 conventionally in order to obtain the desired high dust collection engine performance, considering as a two-step configuration as shown in drawing 1 cuts with the gestalt 1 of this operation. Therefore, the whole equipment becomes compact and space-saving-izing and low cost-ization can be attained. In addition, since the ceramics 15 has many breakthroughs 16, it does not make pressure loss increase not much, even if it forms the ceramics 15 between the 1st electrode 13 and the 2nd electrode 14.

[0023] Moreover, since a charged particle flows the inside of each breakthrough 16 of the ceramics 15 and uptake is carried out to the internal surface of each breakthrough 16, its travel of a charged particle is short compared with the former. For this reason, the gas flow direction die length D3 of the ceramic dust collection section 12 It can also shorten, consequently the whole equipment becomes compact further, and space-saving-ization can be attained.

[0024] In addition, uptake of the charged particle is not carried out by the whole internal surface of a breakthrough 16, but uptake is carried out by one internal surface of the direction of electric field, and the direction which intersects perpendicularly. For example, at breakthrough 16A of drawing 2 (b), uptake is carried out by internal-surface 16A-1 by the side of drawing Nakagami, by breakthrough 16B, uptake is

carried out by internal-surface 16B-1 by the side of drawing Nakamigi, in breakthrough 16C, uptake is carried out internal-surface 16C-1 by the side of drawing Nakashita, and uptake is carried out by breakthrough 16D internal-surface 16A-1 of the left-hand side in drawing. Then, it is the gestalt 2 of the operation which explains below, and the gestalt 3 of operation which made large the internal surface of the side which carries out uptake of this charged particle.

[0025] Drawing of longitudinal section (E-E line view sectional view of drawing 3 (b)) of the ceramic dust collection section with which the electrostatic precipitator which [gestalt 2 of operation] drawing 3 (a) requires for the gestalt 2 of operation of this invention was equipped, and drawing 3 (b) are the cross-sectional views (D-D line view sectional view of drawing 3 (a)) of said ceramic dust collection section. In addition, about the whole electrostatic precipitator configuration of the gestalt 2 of this operation, it is the same as that of the gestalt 1 of the above-mentioned implementation (refer to drawing 1 ), and since it is the configuration replaced with the ceramic dust collection section 22 which shows the latter ceramic dust collection section to drawing 3 from the ceramic dust collection section 12 shown in drawing 2 , detailed explanation here is omitted.

[0026] The electrostatic precipitator of the gestalt 2 of <configuration> book operation is a two-step configuration which has arranged the dust collection section 2 same in the preceding paragraph as usual (refer to drawing 1 ), and has arranged the ceramic dust collection section 22 shown in the latter part at drawing 3 .

[0027] As shown in drawing 3 , in the ceramic dust collection section 22, the ceramics 25 which is a dielectric is arranged between the 1st electrode 23 and the 2nd electrode 24. The ceramics 25 is a porous dielectric which has the breakthrough 26 of a large number penetrated along with the gas flow direction (the direction of arrow-head A), and these breakthroughs 26 serve as a gas passageway.

[0028] And the breakthrough 26 all serves as the shape of a rectangle with a cross-section configuration long in the direction of electric field (longitudinal direction in drawing 3 (b)) formed between the 1st electrode 23 and the 2nd electrode 24, and the direction which intersects perpendicularly. That is, the internal surface (internal surface of the side which carries out uptake of the charged particle) 26-1 of the direction of electric field and the direction which intersects perpendicularly is larger than the internal surface 26-2 parallel to the direction of electric field. The direction die length D4 of electric field of the cross section of a breakthrough 26 For example, it is about 3mm. In addition, the breakthrough 26 has aligned in the direction of four directions in drawing 3 (b), and the ceramic 25 whole has become honeycomb-like.

[0029] The 1st electrode 23 and the 2nd electrode 24 are plate-like electrodes, and as they meet a gas flow direction, opposite arrangement is carried out at the both sides of the ceramics 25. High tension is impressed to the 1st electrode 23 and the 2nd electrode 24 by high voltage DC power supply 27. An electrical potential difference is impressed so that the 1st electrode 23 with which the ground 28 was given at this time may turn into a positive electrode and the 2nd electrode 24 may turn into a negative electrode.

[0030] According to the electrostatic precipitator of the gestalt 2 of an operation and <effectiveness> book implementation, if high tension is impressed to the 1st electrode 23 and the 2nd electrode 24 by high voltage DC power supply 27, the electric field produced between the 1st electrode 23 and the 2nd electrode 24 will be applied to the ceramic 25 whole. Therefore, uptake of the charged particle which was charged in the dust collection section 2 of the preceding paragraph, and was introduced to the latter ceramic dust collection section 22 is carried out to the internal surface 26-1 of the breakthrough 26 of the ceramics 25 by operation of the electric field applied to the ceramic 25 whole.

[0031] and since the ceramics 25 has many breakthroughs 16, compared with the conventional dust collection section 2 (refer to drawing 5 and drawing 6 ), it is markedly alike, dust collection area becomes large, and the ceramic dust collection section 22 of dust collection efficiency improves substantially.

[0032] And by having made the cross-section configuration of the breakthrough 26 of the ceramics 25 into the shape of a rectangle long in the direction of electric field formed between the 1st electrode 23 and the 2nd electrode 24, and the direction which intersects perpendicularly, rather than the gestalt 1 of the above-mentioned implementation, further, dust collection area becomes large, dust collection efficiency improves, the whole equipment becomes compact, and space-saving-izing and low cost-ization can be attained. In addition, since this ceramics 25 has many breakthroughs 26, it does not make pressure loss increase not much like the case of the gestalt 1 of the above-mentioned implementation, even if it forms the ceramics 25 between the 1st electrode 23 and the 2nd electrode 24.

[0033] Moreover, since electric-field lay length becomes short further rather than the gestalt 1 of the above-mentioned implementation since the breakthrough 26 of the ceramics 25 has the shape of a rectangle with a cross-section configuration long in the direction of electric field, and the direction which intersects

perpendicularly, and the travel of a charged particle becomes short, dust collection efficiency becomes high. For this reason, the gas flow direction die length D5 of the ceramic dust collection section 22 It can also be made still shorter than the gestalt 1 of the above-mentioned implementation, consequently the whole equipment becomes compact further, and space-saving-ization can be attained.

[0034] Drawing of longitudinal section (G-G line view sectional view of drawing 4 (b)) of the ceramic dust collection section with which the electrostatic precipitator which [gestalt 3 of operation] drawing 4 (a) requires for the gestalt 3 of operation of this invention was equipped, and drawing 4 (b) are the cross-sectional views (F-F line view sectional view of drawing 4 (a)) of said ceramic dust collection section. In addition, about the whole electrostatic precipitator configuration of the gestalt 3 of this operation, it is the same as that of the gestalt 1 of the above-mentioned implementation (refer to drawing 1 ), and since it is the configuration replaced with the ceramic dust collection section 32 which shows the latter ceramic dust collection section to drawing 4 from the ceramic dust collection section 12 shown in drawing 2 , detailed explanation here is omitted.

[0035] The electrostatic precipitator of the gestalt 3 of <configuration> book operation is a two-step configuration which has arranged the dust collection section 2 same in the preceding paragraph as usual (refer to drawing 1 ), and has arranged the ceramic dust collection section 32 shown in the latter part at drawing 4 .

[0036] As shown in drawing 4 , in the ceramic dust collection section 32, the ceramics 35 which is a dielectric is arranged between the 1st electrode 33 and the 2nd electrode 34. The ceramics 35 is a porous dielectric which has the breakthrough 36 of a large number penetrated along with the gas flow direction (the direction of arrow-head A), and these breakthroughs 36 serve as a gas passageway.

[0037] And the breakthrough 36 all serves as the shape of a slit of the die length covering the abbreviation overall length of the ceramic width of face (width of face of the vertical direction of the ceramics 35 in drawing 4 (b)) of this rectangular direction for a long time in the direction in which the direction of electric field (longitudinal direction in drawing 4 (b)) formed between the 1st electrode 33 and the 2nd electrode 34 and a cross-section configuration cross at right angles. That is, this slit-like breakthrough 36 serves as a configuration which two or more rectangle-like breakthroughs 26 of the vertical direction shown in drawing 3 (b) are made to continue, and was made into the shape of a long and slender rectangle of one.

[0038] For this reason, the internal surface (internal surface of the side which carries out uptake of the charged particle) 36-1 of the direction of electric field and the direction which intersects perpendicularly is very larger than the internal surface 36-2 parallel to the direction of electric field. The direction die length D6 of electric field of the cross section of a breakthrough 36 For example, it is about 3mm. In addition, the breakthrough 36 has aligned at the longitudinal direction in drawing 4 (b), and the ceramic 35 whole has become honeycomb-like.

[0039] The 1st electrode 33 and the 2nd electrode 34 are plate-like electrodes, and as they meet a gas flow direction, opposite arrangement is carried out at the both sides of the ceramics 35. High tension is impressed to the 1st electrode 33 and the 2nd electrode 34 by high voltage DC power supply 37. An electrical potential difference is impressed so that the 1st electrode 33 with which the ground 38 was given at this time may turn into a positive electrode and the 2nd electrode 34 may turn into a negative electrode.

[0040] According to the electrostatic precipitator of the gestalt 3 of an operation and <effectiveness> book implementation, if high tension is impressed to the 1st electrode 33 and the 2nd electrode 34 by high voltage DC power supply 37, the electric field produced between the 1st electrode 33 and the 2nd electrode 34 will be applied to the ceramic 35 whole. Therefore, uptake of the charged particle which was charged in the dust collection section 2 of the preceding paragraph, and was introduced to the latter ceramic dust collection section 32 is carried out to the internal surface 36-1 of the breakthrough 36 of the ceramics 35 by operation of the electric field applied to the ceramic 35 whole.

[0041] and since the ceramics 35 has many breakthroughs 36, compared with the conventional dust collection section 2 (refer to drawing 5 and drawing 6 ), it is markedly alike, dust collection area becomes large, and the ceramic dust collection section 32 of dust collection efficiency improves substantially.

[0042] And by having made the cross-section configuration of the breakthrough 36 of the ceramics 35 into the shape of a slit of the die length covering the abbreviation overall length of the ceramic width of face of this rectangular direction for a long time in the direction of electric field formed between the 1st electrode 33 and the 2nd electrode 34, and the direction which intersects perpendicularly Rather than the gestalt 1 of the above-mentioned implementation, or the gestalt 2 of operation, further, dust collection area becomes large, dust collection efficiency improves, the whole equipment becomes compact, and space-saving-izing and low cost-ization can be attained. since [ furthermore, ] pressure loss is reduced rather than the gestalt 2

of the above-mentioned implementation -- more -- low voltage -- it becomes a disadvantage equipment configuration.
[0043] Moreover, since electric-field lay length becomes short further rather than the gestalt 1 of the above-mentioned implementation since the breakthrough 36 of the ceramics 35 has the shape of a slit with a cross-section configuration long in the direction of electric field, and the direction which intersects perpendicularly, and the travel of a charged particle becomes short, dust collection efficiency becomes high. For this reason, the gas flow direction die length D7 of the ceramic dust collection section 32 It can also be made still shorter than the gestalt 1 of the above-mentioned implementation, consequently the whole equipment becomes compact further, and space-saving-ization can be attained.
[0044] in addition, the dust collection section 2 same with the gestalten 1, 2, and 3 of the above-mentioned implementation as usual -- that is As shown in drawing 6 , impress high tension between a collecting electrode 3 and a discharge electrode 4, and a charge is given to the soot dust in the gas which flows between a collecting electrode 3 and discharge electrodes 4. Although considered as the configuration which has arranged the dust collection section 2 constituted so that uptake of this charged particle might be carried out to a collecting electrode 3 in the preceding paragraph, and has arranged the ceramic dust collection sections 12 and 22 or 32 in the latter part of this dust collection section 2 It is good also as an electrostatic precipitator which does not necessarily limit to this and was equipped only with the ceramic dust collection sections 12 and 22 or 32. That is, since a charge can be given to the soot dust in gas also by the electric field formed between the 1st electrode 13 and 23, 33 and the 2nd electrode 14 and 24, or 34, dust can also be collected with the electrostatic precipitator equipped only with the ceramic dust collection sections 12 and 22 or 32.
[0045] If it puts in another way, when electrification of the ceramic dust collection sections 12 and 22 or the soot dust in 32 is not enough, it is effective to arrange the same dust collection section 2 as usual in the preceding paragraph like the gestalten 1 and 2 of the above-mentioned implementation or 3, and to arrange the ceramic dust collection sections 12 and 22 or 32 in the latter part of this dust collection section 2.
[0046] Moreover, although ceramics 15 and 25 or 35 was used as a dielectric with the gestalten 1, 2, and 3 of the above-mentioned implementation, it may not limit to the ceramics and you may be other dielectrics. For example, when considering as a dielectric configuration as shown in drawing 4 , using the cloth stretched up and down is also considered.
[0047] Moreover, the cross-section configuration of the breakthrough in a porous dielectric may not necessarily be limited to the configuration shown in the gestalten 1 and 2 of the above-mentioned implementation, or 3, and may be other configurations.
[0048]
[Effect of the Invention] As concretely explained with the gestalt of implementation of invention, as mentioned above, the electrostatic precipitator of the 1st invention By arranging the porous dielectric which has the breakthrough of a large number penetrated along with the gas flow direction between the 1st electrode and the 2nd electrode, impressing high tension to this 1st electrode and 2nd electrode, and applying electric field to the porous whole dielectric It is characterized by having the dielectric dust collection section which constitutes and becomes so that uptake of the soot dust in the gas which flows the breakthrough of a porous dielectric may be carried out by the internal surface of this breakthrough.
[0049] Moreover, it is characterized by for the electrostatic precipitator of the 2nd invention being a tubed electrode with which the 1st electrode surrounds the perimeter of a porous dielectric in the electrostatic precipitator of the 1st invention, and the 2nd electrode being a cylindrical electrode arranged along with a gas flow direction in the inside center section of the 1st electrode.
[0050] That is, according to the electrostatic precipitator of this 1st or 2nd invention, if high tension is impressed to the 1st electrode and the 2nd electrode, the electric field produced between the 1st electrode and the 2nd electrode will be applied to the porous whole dielectric. Therefore, uptake of the charged particle charged with the charged particle or this electrostatic precipitator which was charged in the preceding paragraph of this electrostatic precipitator, and was introduced into this electrostatic precipitator is carried out to the internal surface of the breakthrough of a porous dielectric by operation of the electric field applied to the porous whole dielectric.
[0051] and since a porous dielectric has many breakthroughs, compared with the conventional dust collection section, it is markedly alike, dust collection area becomes large, and dust collection efficiency of the dielectric dust collection section improves substantially. For this reason, number-of-stages reduction of the dust collection section can also be aimed at. Therefore, the whole equipment becomes compact and space-saving-izing and low cost-ization can be attained. In addition, since this porous dielectric has many

breakthroughs, it does not make pressure loss increase not much, even if it prepares a porous dielectric between the 1st electrode and the 2nd electrode.
[0052] Moreover, since a charged particle flows the inside of each breakthrough of a porous dielectric and uptake is carried out to the internal surface of each breakthrough, its travel of a charged particle is short compared with the former. For this reason, the gas flow direction die length of a porous dielectric can also be shortened, consequently the whole equipment becomes compact further, and space-saving-ization can be attained.
[0053] Moreover, it is characterized by for the 1st electrode and the 2nd electrode having been plate-like electrodes, having carried out opposite arrangement of them in the electrostatic precipitator of the 1st invention, at the both sides of a porous dielectric, as the electrostatic precipitator of the 3rd invention met the gas flow direction, and the breakthrough of a porous dielectric considering as the shape of a rectangle with a cross-section configuration long in the direction of electric field formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly.
[0054] Therefore, according to the electrostatic precipitator of this 3rd invention, the same operation and effectiveness as the electrostatic precipitator of the 1st or 2nd invention of the above are acquired. And by having made the cross-section configuration of the breakthrough of a porous dielectric into the shape of a rectangle long in the direction of electric field formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly, further, dust collection area becomes large, dust collection efficiency improves, the whole equipment becomes compact, and space-saving-izing and low cost-ization can be attained.
[0055] Moreover, since electric-field lay length becomes short further since the breakthrough of a porous dielectric has the shape of a rectangle with a cross-section configuration long in the direction of electric field, and the direction which intersects perpendicularly, and the travel of a charged particle becomes short, dust collection efficiency becomes high. For this reason, the gas flow direction die length of the dielectric dust collection section can also be shortened further, consequently the whole equipment becomes compact further, and space-saving-ization can be attained.
[0056] Moreover, the electrostatic precipitator of the 4th invention is set to the electrostatic precipitator of the 1st invention. The 1st electrode and the 2nd electrode are plate-like electrodes, and as they meet a gas flow direction, they carry out opposite arrangement at the both sides of a porous dielectric. It is characterized by the breakthrough of a porous dielectric considering as the shape of a slit of the die length covering the abbreviation overall length of the porous dielectric width of face of this rectangular direction for a long time in the direction of electric field where a cross-section configuration is formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly.
[0057] Therefore, according to the electrostatic precipitator of this 4th invention, the same operation and effectiveness as the electrostatic precipitator of the 1st, 2nd, or 3rd invention of the above are acquired. And by having made the cross-section configuration of the breakthrough of a porous dielectric into the shape of a slit of the die length covering the abbreviation overall length of the ceramic width of face of this rectangular direction for a long time in the direction of electric field formed between the 1st electrode and the 2nd electrode, and the direction which intersects perpendicularly, rather than the electrostatic precipitator of the 3rd invention of the above, further, dust-collection area becomes large, dust collection efficiency improves, the whole equipment is miniaturized, and space-saving-izing and low-cost-ization can be attained. since [ furthermore, ] pressure loss is reduced rather than the electrostatic precipitator of the 3rd invention of the above -- more -- low voltage -- it becomes a disadvantage equipment configuration.
[0058] Moreover, the electrostatic precipitator of the 5th invention impresses high tension between a collecting electrode and a discharge electrode. Give a charge to the soot dust in the gas which flows between this collecting electrode and discharge electrode, and the dust collection section constituted so that uptake of this charged particle might be carried out to a collecting electrode is arranged in the preceding paragraph. It is characterized by constituting so that uptake of the charged particle which has arranged the dielectric dust collection section indicated to said claims 1, 2, and 3 or 4 in the latter part of this dust collection section, and came out of the dust collection section of the preceding paragraph to it may be carried out by the internal surface of the breakthrough of the porous dielectric in the latter dielectric dust collection section.
[0059] Therefore, according to the electrostatic precipitator of this 5th invention, the same operation and effectiveness as the electrostatic precipitator of the 1st, 2nd, 3rd, or 4th invention of the above are acquired. And it is effective when electrification of the soot dust especially in the dielectric dust collection section is not enough.

[Translation done.]

* NOTICES *



1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

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DRAWINGS

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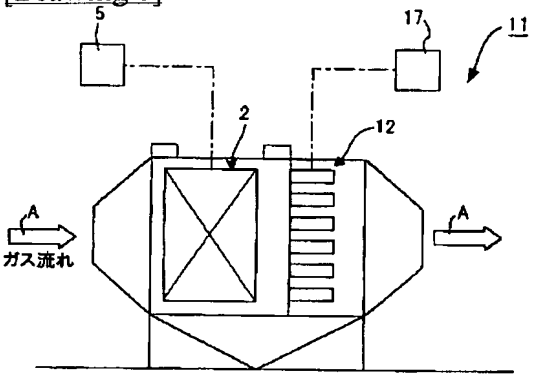
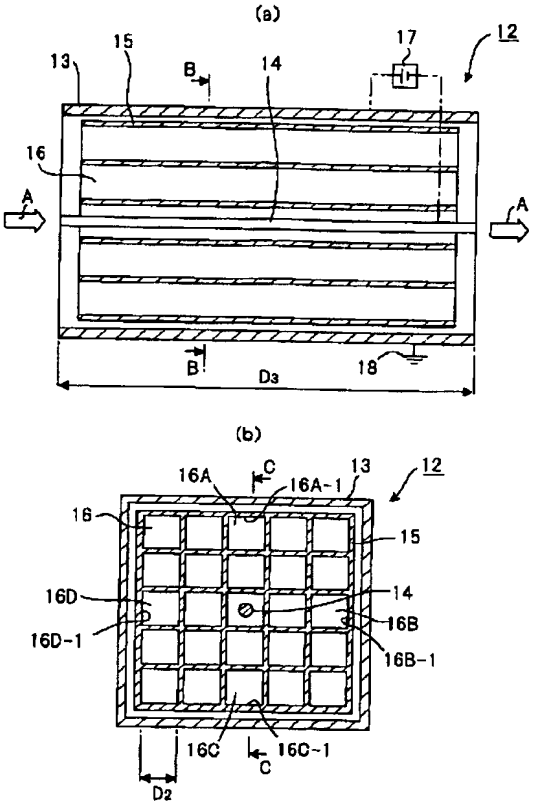
[Drawing 1]



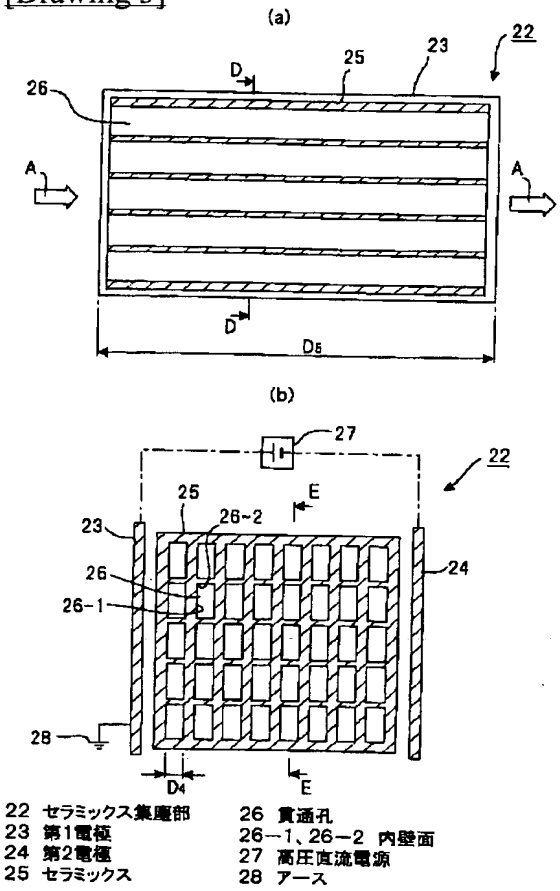

2 集塵部
5 高圧直流電源
11 電気集塵装置
12 セラミック集塵部
17 高圧直流電源

[Drawing 2]



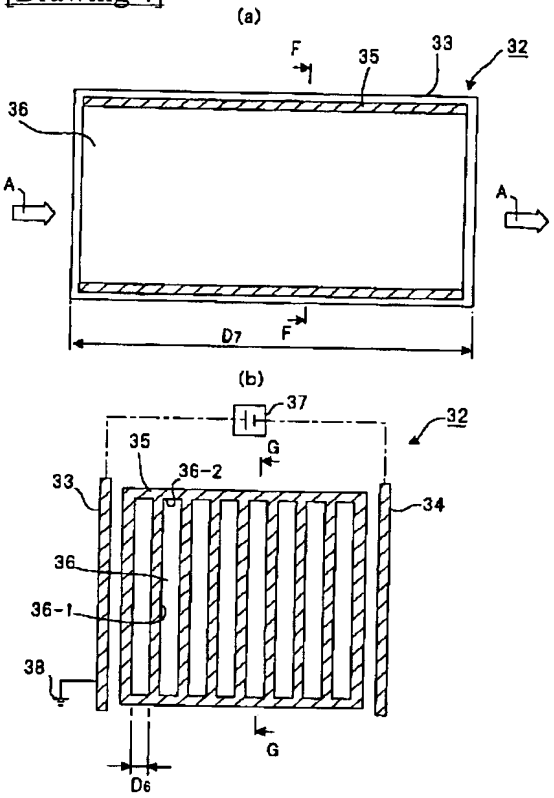

12 セラミックス集塵部
13 第1電極
14 第2電極
15 セラミックス
16、16A、16B、16C,16D 貫通孔
16A-1、16B-1、16C-1、16D-1 内壁面
17 高圧直流電源
18 アース

[Drawing 3]



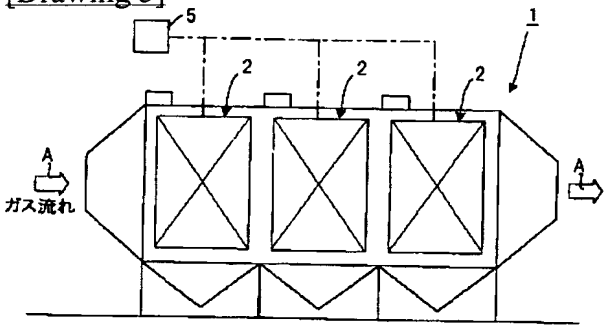

22 セラミックス集塵部
23 第1電極
24 第2電極
25 セラミックス
26 貫通孔
26−1、26−2 内壁面
27 高圧直流電源
28 アース

[Drawing 4]



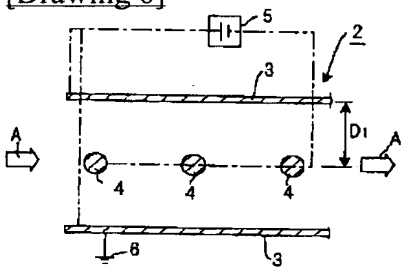

32 セラミックス集塵部
33 第1電極
34 第2電極
35 セラミックス
36 貫通孔
36−1、36−2 内壁面
37 高圧直流電源
38 アース

[Drawing 5]




1 電気集塵装置
2 集塵部
5 高圧直流電源

[Drawing 6]




2 集塵部
3 集塵極
4 放電極
5 高圧直流電源
6 アース

[Translation done.]